



The primary outcome of this study is comparison of the CE events between USGIVs placed by RNs and those placed using standard technique” Ehrman et al (2017).

Abstract:

Study Objectives: Placement of ultrasound-guided peripheral IVs (USGIV) is common practice in many emergency departments; many of these are used for administration of IV contrast for computed tomography (CT) examinations. A single prior study found the contrast extravasation (CE) rate amongst USGIVs placed by physicians to be greater than those placed using standard methods (3.6 vs 0.3%). Many emergency departments (EDs) have registered nurses (RNs) who have been trained in the placement of USGIVs, but whether these perform as well as those placed by physicians is unknown.

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The primary outcome of this study is comparison of the CE events between USGIVs placed by RNs and those placed using standard technique. Secondary outcomes include assessment of the associations between IV characteristics (location, size, length) and patient factors and CE in patients with USGIVs.

**Methods:** This was a retrospective chart review, performed at an urban tertiary care facility with an annual ED volume of 65,000. Our ED has a nursing-lead program that trains RNs to place USGIVs (2.5in 18g or 1.75in 20g). All USGIVs placed by RNs are logged for quality-assurance purposes. We queried our electronic patient safety incident reporting system for all CE events (mandatory reporting is required by our hospital system) between May 2014, and February 2017, during which time the USGIV program was operational. The medical record for each extravasation event was reviewed, and data on patient and IV characteristics were recorded.

**Results:** During the study period, 1,500 USGIVs were placed by 27 RNs. Contrast was administered 29,508 times, 291 via USGIVs. Overall, there were 74 CEs in peripheral IVs (0.25%), of which 12 (4.1%) occurred with USGIVs, and 62 (0.21%) occurred in the 29,217 patients with standard IVs (relative risk 19.4, 95% CI 10.6-35.6; absolute risk difference 3.9%, 95% CI 1.6-6.2%). There were no significant differences between groups in terms of proportion of females (72% of CEs, n=9 and 42 in the USGIV and standard IV groups, respectively), history of ESRD, IVDA, or BMI, or the number of CT angiograms (67% (n=48) of total CEs, 6 in USGIV group and 42 in standard IV group). In the USGIV group, 6 were located in the forearm, 5 in the upper arm, and 1 in the antecubital fossa (AC); there were five 18g and seven 20g IVs in this group. In the standard group, IV location was 28 AC, 24 forearm, 5 upper arm, 4 wrist/hand, and 1 shoulder; there were forty-nine 20g, five 18g, seven 22g, and one 24g IVs.

**Conclusions:** We found that the overall risk of CE with USGIVs placed by RNs to be low (4.1%), but significantly greater compared to IVs placed using standard technique (0.21%). These results are similar to a previously published study, in which USGIVs were placed by physicians. While further study is needed to delineate what, if any, operator characteristics are associated with CEs, our results suggest that USGIVs placed by RNs trained in the procedure perform as well those placed by physicians. Extravasation events are relatively rare, and the small number of CEs in the USGIV group (n=12) did not allow for meaningful comparisons of IV characteristics between the two groups. Larger data sets, likely drawn from multiple institutions (given the relative paucity of extravasations via USGIVs) are needed to ascertain whether IV gauge, location, or catheter length have an affect on contrast extravasation.



**Full Text**

Reference:

Ehrman, R.R., Kasten, A., Wells, R., Vidri, R., Smith, A.N. and Gallien, J.Z. (2017) 339 Comparison of Intravenous Contrast Extravasation Rates from Peripheral IVs Placed by Registered Nurses Using Ultrasound Guidance Versus Standard Methods. *Annals of Emergency Medicine*. 70(4), Supplement, S134-S135.

DOI: <http://dx.doi.org/10.1016/j.annemergmed.2017.07.410>

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